

## THE INTERNET ANALYSIS SEMINAR

Dear Colleagues:

Welcome to the Internet Analysis Seminar for Fall 2010 - Spring 2011. The Internet Analysis Seminar provides a forum for researchers in the areas of complex analysis, function theory, harmonic analysis, and operator theory, to interact and learn from one another, both academically and professionally. The Seminar includes three phases involving Internet lectures, working groups, and a final conference. Each year, a topic in the areas mentioned above will be chosen and an Internet seminar will be developed with corresponding lectures. The Internet Analysis Seminar is generously supported by National Science Foundation DMS # 0955432.

A primary goal of the Seminar is to increase the collaborative learning and mentoring between graduate students, post-doctoral researchers and senior faculty across the country. The Seminar takes the standard dissemination of research results further, providing an open, inclusive setting for junior mathematicians to learn new research concepts and apply them through group projects with more senior researchers.

In Phase I (October - February), approximately fifteen weekly, electronic lectures will be provided via a public website. In Phase II (March - May), participants from Phase I will be organized into smaller, diverse groups from various institutions to work on more advanced projects. Phase III consists of a final one-week workshop held in July, during which, teams will present their projects and additional lectures will be delivered by leading experts in the field.

The topic of the seminar will be analytic function theory and in particular the Besov-Sobolev space of analytic functions on the unit disc. In the hopes of giving the students the quickest introduction to the topics and to provide the most overview many of the results that were covered focused on the space  $H^2(\mathbb{D})$  and  $\mathcal{D}(\mathbb{D})$ , that Hardy space and Dirichlet space of the unit disc. In particular, we have omitted (most) of the story about what happens when  $1 < p < \infty$  (though frequently may make comments about this). Additionally, we frequently will make the transition between  $\mathbb{D}$  and  $\mathbb{C}_+$  (or sometimes denoted by  $\mathbb{H}$ ) when the argument is easier in that context. The interested participants should have some basic complex analysis, real analysis and functional analysis since we will use these tools very frequently, and sometimes with out much additional comments about it. All lectures will be written more for the newcomer to the area.

The seminar will first introduce most of the topics necessary for the Hardy space and then use them as a point of comparison to see what was/is known in the Dirichlet space. The introduction for the Hardy space will be “mostly” self contained, though there will be some topics that we will just take as gospel so that we can ultimately proceed to learning about the story in the Dirichlet space. The topics that will be covered in the seminar include the following:

- Definitions of these Spaces;
- Computations of their Reproducing Kernels;
- Definitions of their Carleson measures and Geometric Characterizations;

- Interpolation Theorems in the space and in the multiplier algebra;
- Corona Theorems in the Space and in the multiplier algebra.

Based on my personal interests, we will focus much more on the function theory and harmonic analysis aspects associated with these spaces. There is an entire chapter that could (and should) be written on the connections between these spaces and operator theory and likely we will address some of these topics in Phase II of the seminar.

If you are interested in participating please visit the website:

<http://internetanalysisseminar.gatech.edu/>

where you can download the lectures as they are updated (I will attempt to make this happen every Monday). There is also a discussion form there where participants can post questions/comments about the lectures as they go along. To be able to post comments, you will need to register as a user of the site, but this is very easy and straightforward to figure out. The website is (and will be for awhile) in development and some features may change from time to time. If there is something that would be beneficial to the participants, just let me know and I can try to make it happen (post the comment in the forum).

This will likely be a learning experience for both the participants and me as the organizer. So I ask for some patience from all that are involved.

Regards,  
Brett Wick